REMARKS

In section 7 of the Office Action, the Examiner rejected claims 1 and 2 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath.

Independent claim 1 is directed to an apparatus having a non-ferromagnetic compressor wheel of a turbocharger, a permanent magnet, and at least one magnetoresistor. The non-ferromagnetic compressor wheel has fins. The permanent magnet is positioned so as to induce eddy currents on the fins. The at least one magnetoresistor is positioned with respect to the non-ferromagnetic compressor wheel and the permanent magnet so as to be magnetically biased by the permanent magnet and so as to sense rotation of the non-ferromagnetic compressor wheel.

Behrens discloses in Figure 1 a housing 1 of a turbocharger. The housing 1 has a non-magnetic housing wall 2. Aluminum compressor blades 6 rotate within the housing 1 on one side of the housing wall 2. A magnet 9 and a coil 10 around the magnet 9 are located on the other side of the housing wall 2.

The magnet 9 produces field lines that impinge at a right angle on the compressor blades 6. Currents are induced in the compressor blades 6 as they move

across the field lines. These induced currents produce a secondary magnetic field that counteracts or damps the magnetic field produced by the magnet 9 and induces a current in the coil 10. This current induced in the coil 10 indicates the rotational speed of the turbocharger.

As can be seen, Behrens does not disclose the use of a magnetoresistor that is magnetically biased by the magnet 9 and that senses rotation of a compressor wheel. Accordingly, the Examiner has relied on Nath.

Nath discloses a method of inspecting a coated component 20, such as an airfoil of a turbine engine, by use of an eddy current. A drive pulse supplied by a drive coil 12 is applied at a measurement position 28 on an outer surface 11 of the coated component 20. The drive pulse generates a primary magnetic field, which induces an eddy current within the coated component 20. The eddy current in turn generates a secondary magnetic field that is sensed by the magnetic field sensor 14. The magnetic field sensor 14 may be a giant magnetoresistive (GMR) sensor.

The presence of a crack 52 in the coated component 20 changes the flow of the eddy current within the coated component 20. The altered eddy current, in turn, produces a modified secondary magnetic field, which

is detected by the magnetic field sensor 14. The signal produced by the magnetic field sensor 14 is compared to a reference. The crack 52 is detected on the basis of this comparison.

The airfoil 20 may be stationary or may be mounted on a rotor disk 30, which is attached to a rotor 10 positioned in the turbine engine. In this latter case, the drive coil 12 and the magnetic field sensor 14 are retracted prior to rotation of the rotor disk 30 in order to protect the drive coil 12 and the magnetic field sensor 14 from damage.

The Examiner asserts that it would have been obvious to use the magnetic field sensor 14, which might be a giant magnetoresistor, in place of the coil 10 disclosed in Behrens.

However, independent claim 1 also recites that the magnetoresistor is positioned with respect to the permanent magnet so as to be magnetically biased by the permanent magnet. Behrens is silent on this feature since it does not disclose the use of a magnetoresistor. Although Nath states that the magnetic field sensor 14 can be a giant magnetoresistor, Nath does not disclose or suggest biasing the giant magnetoresistor with any device, much less with a permanent magnet.

Accordingly, even if it had been obvious to use a magnetoresistor in place of the coil 10 shown in Behrens (which applicants do not concede), it would not have been obvious in view of Nath to position the magnetoresistor so as to be biased by the permanent magnet 9 of Behrens.

For this reason, independent claim 1 is not unpatentable over Behrens in view of Nath.

Moreover, the Examiner has offered no valid motivation as to why one of ordinary skill in the art would have combined Behrens and Nath as suggested by the Examiner. Accordingly, the Examiner has not made out a prima facie case of obviousness with respect to independent claim 1.

Therefore, for this reason also, independent claim 1 is not unpatentable over Behrens in view of Nath.

Because independent claim 1 is not unpatentable over Behrens in view of Nath, dependent claim 2 is likewise not unpatentable over Behrens in view of Nath.

Examiner's Reply - The Examiner appears to argue that, if the magnetoresistor of Nath were substituted for the coil of Behrens according to the Examiner's combination of these two references, the

magnet of Behrens would inherently bias the magnetoresistor of Nath.

Applicants Rebuttal - This argument is not correct. For example, one skilled in the art will understand that, if the magnetic field produced by the magnetic were along the easy axis of the magnetoresistor, then the magnetoresistor is not biased at all. Indeed, from the standpoint of biasing, the magnet might as well not be used at all. Thus, even if it were obvious to combine the magnetoresistor of Nath with the magnet of Behrens so as to measure eddy currents, it cannot be concluded that the magnet of Behrens will be used so as to bias the magnetoresistor of Nath.

Moreover, there is no disclosure in either Behrens or Nath to suggest that the magnet of Behrens be oriented with respect to the magnetoresistor of Nath so that the magnetoresistor of Nath is biased. Thus, one skilled in the art would not be directed to position the magnet of Behrens with respect to the magnetoresistor of Nath so that the magnet of Behrens biases the magnetoresistor of Nath.

Accordingly, it would not have been obvious to combine Behrens and Nath so as to produce the apparatus of independent claim 1.

Furthermore, the Examiner disagrees that the Examiner has cited no motivation that would have led one of ordinary skill in the art to combine Behrens and Nath so as to produce the invention of independent claim 1. In disagreeing with applicants, the Examiner engages in a bit of circular reasoning. That is, the Examiner, in effect, states that, because it would have been obvious to substitute the magnetoresistor of Nath for the coil of Behrens, one of ordinary skill in the art would have been motivated to do so. The Examiner completes the circular argument by concluding that, because one of ordinary skill in the art would have been motivated to do so, it would have been obvious to substitute the magnetoresistor of Nath for the coil of Behrens.

As can be seen, this argument is based on mere conclusions. The Examiner has not demonstrated the existence of motivation by either evidence or logical reasoning. The Examiner states two premises: Nath discloses the use of a magnetoresistor to measure eddy currents; and, Behrens is all about measuring eddy currents. The Examiner then leaps to the conclusion that it would have been obvious to use the magnetoresistor of Nath in place of the coil in Behrens. However, the conclusion does not necessarily follow from the premises,

and the Examiner has offered no logic that ties the conclusion to the premises.

Accordingly, the Examiner has not established a prima facie case of obviousness. For this reason also, it would not have been obvious to combine Behrens and Nath so as to produce the apparatus of independent claim 1.

In section 8 of the Office Action, the Examiner rejected claims 3 and 4 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Cila.

Cila discloses a magnetic pick up 10 that includes a hexagonal housing 12 attached to a threaded connector stud 14 at one end and a threaded hollow stud 16 at its other end. The threaded hollow stud 16 contains a permanent magnet 22 having a pair of magnetoresistors 26 and 28 at its tip coupled to leads 28 and 29 for connection to an electrical circuit within the housing 12. The magnetoresistors 26 and 28 detect ferromagnetic gear teeth 32 as the gear teeth 32 pass by the magnetoresistors 26 and 28. The threaded hollow stud 16 and a lock nut 18 are used to mount the magnetic pick up to a support.

As discussed above, Behrens and Nath do not disclose and do not suggest to one of ordinary skill in the art the biasing of a magnetoresistor by use of a permanent magnet. Cila is also silent on using the permanent magnet 22 to bias the magnetoresistors 26 and 28. As far as these references are concerned, the magnetic field produced by the magnet is along the easy axis of the magnetoresistor so that the magnetoresistor is not biased at all.

Moreover, Cila provides no motivation to combine Behrens and Nath.

Accordingly, for both of these reasons, it would not have been obvious in view of Nath and Cila to replace the coil of Behrens with the magnetoresistor of Nath and to position the Nath magnetoresistor so as to be biased by the permanent magnet 9 of Behrens.

For this reason, independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of Cila.

Because independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of Cila, dependent claims 3 and 4 are likewise not unpatentable over Behrens in view of Nath and further in view of Cila.

In section 9 of the Office Action, the Examiner rejected claims 5-7 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Takizawa.

Takizawa discloses a wheel rotation detecting device having a hub 4 with a flange 10. A wheel and a disk rotor of a brake are fixed to a flange 10. An outside inner ring raceway 7 is formed on the outer periphery of the hub 4, and an inside inner ring raceway 7 is formed in an inner ring 5 fixed to a stepped portion 16 provided in the hub 4. An outer ring 1 includes a double row of outer ring raceways 6, and balls 8 are interposed between the outer ring raceways 6 and the inner ring raceways 7 so that a rotary ring 3 that includes the hub 4 is rotatably supported by the outer ring 1.

An encoder 13 is supported on the hub 4, and a sensor unit 20 is supported on the outer ring 1. The sensor unit 20 can be fixed to the outer ring 1 by screwing a flange 22 formed in the upper end of the sensor unit 20 to the outer ring 1. The sensor unit 20 includes a rotation detecting sensor 25 and a temperature sensor 26. The rotation detecting sensor 25 comprises a magnetic detection element 27, a permanent magnet 28, and

a waveform shaping circuit 29. The magnetic detection element 27 can be a magnetoresistor. The temperature sensor 26 detects the temperature of the space 12 within which the balls 8 are disposed.

The encoder 13 is formed of a magnetic metal material having gear-shaped portions that cause the sensed magnetic characteristics to vary alternately and at regular intervals with respect to the circumferential direction. Accordingly, the rotation detecting sensor 25 detects the rotation speed and/or rotation number of the wheel attached to the hub 4 by detecting these varying magnetic characteristics.

As discussed above, Behrens and Nath do not disclose and do not suggest to one of ordinary skill in the art the biasing of a magnetoresistor by use of a permanent magnet. Takizawa is also silent on using the permanent magnet 29 to bias the magnetic detection element 27. As far as these references are concerned, the magnetic field produced by the magnet is along the easy axis of the magnetoresistor so that the magnetoresistor is not biased at all.

Moreover, Takizawa provides no motivation to combine Behrens and Nath.

Accordingly, for both of these reasons, it would not have been obvious in view of Nath and Takizawa to replace the coil of Behrens with the magnetoresistor of Nath and to position the Nath magnetoresistor so as to be biased by the permanent magnet 9 of Behrens.

For this reason, independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of Takizawa.

Because independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of Takizawa, dependent claims 5-7 are likewise not unpatentable over Behrens in view of Nath and further in view of Takizawa.

In section 10 of the Office Action, the Examiner rejected claims 8 and 9 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Stolfus.

Stolfus shows in Figure 4 a sensor ring 21 having a constant clearance between a pole piece 23 of a sensor coil 22 and each tip of the sensor ring 21. The electromagnetic coil 22 receives a magnetic flux change caused by the changing clearance between the sensor coil 22 and the successive tips and grooves of the sensor ring 21.

Stolfus also shows in Figure 5 a vehicle speed sensor conditioning circuit 100. The circuit 100 includes a flip-flop 108/110, a binary counter 112, and a transistor 122. A sensor output 124 is connected to the clock input of the circuit 108. The circuit 100 functions to divide a sensor output by 12 in order to improve the duty cycle output of a vehicle speed sensor circuit. The circuit 100 is generally configured to provide a particular number of pulses per distance of vehicle travel.

Figure 6 of Stolfus depicts a flow chart having a block 202 at which the vehicle speed sensor circuit 100 provides a particular number of pulses per distance of vehicle travel. At block 204, the vehicle speed sensor circuit 100 is configured so that the output of the speed sensor is divided by a particular value. At block 206, different values are placed on the parallel load pins of the binary counter 112 which permits the sensor output to be divided by placing different values on the parallel load pins. At block 208, a flip-flop is utilized to trigger on negative edges. Negative-edge spacing is thus independent of a sensor air gap, as indicated at block 210. The output of the circuit 100 is thus near 50% duty cycle as indicated at block 212.

As discussed above, neither Behrens nor Nath discloses or suggests biasing a magnetoresistor with any device much less a permanent magnet. Similarly, Stolfus is silent on using a permanent magnet to bias a magnetoresistor.

Moreover, Stolfus provides no motivation to combine Behrens and Nath.

Accordingly, for both of these reasons, it would not have been obvious in view of Nath and Stolfus to replace the coil of Behrens with the magnetoresistor of Nath and to position the Nath magnetoresistor so as to be biased by the permanent magnet 9 of Behrens.

Because independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of Stolfus, dependent claims 8 and 9 are likewise not unpatentable over Behrens in view of Nath and further in view of Stolfus.

In section 11 of the Office Action, the Examiner rejected claims 10 and 11 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Cila.

As discussed above, Behrens, Nath, Stolfus, and Cila do not disclose or suggest biasing a magnetoresistor with a permanent magnet.

Moreover, as also discussed above, Cila and Stolfus provide no motivation to combine Behrens and Nath.

Accordingly, for both of these reasons, it would not have been obvious in view of Nath, Stolfus, and Cila to replace the coil of Behrens with the magnetoresistor of Nath and to position the Nath magnetoresistor so as to be biased by the permanent magnet 9 of Behrens.

Accordingly, it would not have been obvious to one of ordinary skill in the art to combine these references so as to produce the invention of independent claim 1.

Therefore, independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Cila.

Because independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Cila, dependent claims 10 and 11 are likewise not unpatentable over

Behrens in view of Nath and further in view of Stolfus and still further in view of Cila.

In section 12 of the Office Action, the Examiner rejected claims 12 and 13 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Takizawa.

As discussed above, Behrens, Nath, Stolfus, and Takizawa do not disclose or suggest biasing a magnetoresistor with a permanent magnet.

Moreover, as also discussed above, Takizawa and Stolfus provide no motivation to combine Behrens and Nath.

Accordingly, for both of these reasons, it would not have been obvious in view of Nath, Stolfus, and Takizawa to replace the coil of Behrens with the magnetoresistor of Nath and to position the Nath magnetoresistor so as to be biased by the permanent magnet 9 of Behrens.

Therefore, independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Takizawa.

Because independent claim 1 is not unpatentable over Behrens in view of Nath and further in view of

Stolfus and still further in view of Takizawa, dependent claims 12 and 13 are likewise not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Takizawa.

In section 13 of the Office Action, the Examiner rejected claims 14-18, 23, and 25 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Takizawa.

Independent claim 14 is directed to an apparatus having a non-ferromagnetic compressor wheel of a turbocharger, a magnetic field sensor housing, a permanent magnet, and an active magnetic field sensor. The non-ferromagnetic compressor wheel has fins. The magnetic field sensor housing is attached to a structure in proximity to the non-ferromagnetic compressor wheel. The permanent magnet is disposed within the magnetic field sensor housing and is positioned so as to induce eddy currents on the fins. The active magnetic field sensor is disposed within the magnetic field sensor housing and is positioned with respect to the non-ferromagnetic compressor wheel and the permanent magnet so as to be magnetically biased by the permanent magnet and so as to sense a magnetic field induced by the eddy

currents to thereby detect rotation of the non-ferromagnetic compressor wheel.

According to the Examiner, it would have been obvious to replace the coil of Behrens with the magnetoresistor (as an active magnetic sensor) disclosed in Nath and to house the resulting magnet and magnetoresistor in the housing disclosed in Takizawa so as to produce the invention of independent claim 14.

However, as indicated above, there is no disclosure in Behrens, Nath, and Takizawa that would have suggested to one of ordinary skill in the art the replacement of the coil of Behrens with the magnetoresistor mentioned in Nath and then biasing the magnetoresistor with the permanent magnet. As discussed above, if the magnetic field of the permanent magnet is along the easy axis of the magnetoresistor, then the magnetoresistor is not biased and the permanent magnet has not measurable affect on the magnetoresistor.

Accordingly, it would not have been obvious in view of Nath and Takizawa to position the Nath magnetoresistor so as to be biased by the Behrens permanent magnet.

For this reason, independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa.

Moreover, as also indicated above, the Examiner has offered to motivation for combining Behrens, Nath, and Takizawa in the manner proffered by the Examiner.

For this additional reason, independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa.

Because independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa, dependent claims 15-18, 23, and 25 are likewise not unpatentable over Behrens in view of Nath and further in view of Takizawa.

In section 14 of the Office Action, the Examiner rejected claim 24 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Adelerhof.

Adelerhof discloses an AMR sensor 3 located on the side of a soft magnetic target wheel 1 that is provided with teeth 5 about its circumference. A bias magnet 2 biases the sensor 3. The magnetic field emanating from the magnet 2 passes the sensor 3 in the

direction towards a shaft 4 if the sensor is between two teeth, or the magnetic field is bent towards the target wheel 1 if the sensor 3 is next to a tooth. The change in field direction is sensed by the sensor 3.

As indicated above, Behrens, Nath, and Takizawa do not disclose or suggest using a permanent magnet both to induce an eddy current on the fins of a non-ferromagnetic compressor wheel and to bias the magnetoresistor that senses the field produce by the eddy current. Similarly, Adelerhof does not disclose or suggest using permanent magnet both to induce an eddy current on the fins of a non-ferromagnetic compressor wheel and to bias the magnetoresistor that senses the field produce by the eddy current.

Accordingly, it would not have been obvious to one of ordinary skill in the art to combine Behrens, Nath, Takizawa, and Adelerhof so as to produce the invention of independent claim 14.

For this reason, independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Adelerhof.

Moreover, as also indicated above, the Examiner has offered to motivation for combining Behrens, Nath,

Takizawa, and Adelerhof in the manner proffered by the Examiner.

For this additional reason, independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Adelerhof.

Because independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Adelerhof, dependent claim 24 is likewise not unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Adelerhof.

In section 15 of the Office Action, the Examiner rejected claims 19-22 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Stolfus.

As discussed above, Behrens, Nath, Takizawa, and Stolfus do not disclose or suggest biasing a magnetoresistor with a permanent magnet. Accordingly, it would not have been obvious to one of ordinary skill in the art to combine these references so as to produce the invention of independent claim 14.

For this reason, independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Stolfus.

Moreover, as also indicated above, the Examiner has offered to motivation for combining Behrens, Nath, Takizawa, and Stolfus in the manner proffered by the Examiner.

For this additional reason, independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Stolfus.

Because independent claim 14 is not unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Stolfus, dependent claims 19-22 are likewise not unpatentable over Behrens in view of Nath and further in view of Takizawa and still further in view of Stolfus.

In section 16 of the Office Action, the Examiner rejected claims 26-33 and 35 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Stolfus.

Independent claim 26 is directed to a method of sensing rotation of a non-ferromagnetic compressor wheel of a turbocharger comprising inducing eddy currents in

fins of the non-ferromagnetic compressor wheel, sensing a magnetic field induced by the eddy currents by use of an active magnetic field sensor so as to produce pulses having a pulse rate dependent upon a speed at which the non-ferromagnetic compressor wheel rotates, and reducing the pulse rate so as to provide a consistent pulse rate regardless of the number of the fins of the non-ferromagnetic compressor wheel.

Behrens, Nath, and Stolfus do not disclose or suggest reducing the pulse rate so as to provide a consistent pulse rate regardless of the number of the fins of the non-ferromagnetic compressor wheel.

Stolfus does state that it is desirable to configure a vehicle speed sensor circuit to provide a certain exact number of pulses per mile of vehicle travel, and that it is also often a requirement of vehicle speed sensor users to obtain an output duty cycle at or very near a fifty-percent (50%) duty cycle.

However, configuring a vehicle speed sensor circuit to provide a certain exact number of pulses per mile of vehicle travel has nothing to do with the number of fins of a non-ferromagnetic compressor wheel. Indeed, the rotation of a non-ferromagnetic compressor wheel has no relationship to distance.

Moreover, having a 50% output duty cycle similarly does not have anything to do with the number of fins of a non-ferromagnetic compressor wheel. The duty cycle merely means the relationship between the high time and the low time of the output pulse and does not bear any relationship to the number of output pulses. Indeed, the number of output pulses could vary from revolution to revolution and yet the duty cycle would remain the same.

Accordingly, the combination of Behrens, Nath, and Stolfus does not suggest the invention of independent claim 26. Therefore, independent claim 26 is not unpatentable over Behrens in view of Nath and further in view of Stolfus.

Because independent claim 26 is not unpatentable over Behrens in view of Nath and further in view of Stolfus, dependent claims 27-33 and 35 are likewise not unpatentable over Behrens in view of Nath and further in view of Stolfus.

Examiner's Reply - The Examiner equates the idea of making a duty cycle output from a vehicle speed sensor circuit independent of an associated sensor duty cycle to the idea of providing a consistent pulse rate regardless of the number of fins of a non-ferromagnetic compressor wheel.

Applicants Rebuttal - These two ideas are not equivalent. The sensor duty cycle is dependent on the widths of the teeth relative to the widths of the spacings between the teeth. Thus, if the teeth are narrow and the spacings are comparatively wide, the resulting duty cycle is less than 50%; but if the teeth are wide and the spacings are comparatively narrow, the resulting duty cycle is greater than 50%. Moreover, if the widths of the teeth relative to the widths of the spacings between the teeth vary over the gear or wheel, the duty cycle will vary. The circuit shown in Stolfus improves this duty cycle by providing an output having a consistent 50% duty cycle.

As can be seen, there is no correlation between duty cycle and the number of teeth. Indeed, if the ratio of tooth width to tooth spacing is the same regardless of the number of teeth, the duty cycle is the same regardless of the number of teeth.

This lack of correlation can be seen from a simple example. A gear having one tooth extending over 180^0 of the gear and one spacing extending over the remaining 180^0 of the gear produces one pulse per revolution. Because the pulse is high for only 1/2 of the cycle, the output has a 50% duty cycle. By contrast,

a gear, which has two teeth and two spacings such that the first tooth extends over 90^0 of the gear, the first spacing extends over the next 90^0 of the gear, the second tooth extends over the next 90^0 of the gear, and the second spacing extends over the remaining 90^0 of the gear, produces two pulses per revolution. Because each pulse is high for only 1/2 of its cycle, the output again has a 50% duty cycle. Thus, the duty cycle is the same for both gears even though in one case there is only one pulse per revolution and in the other case there are two pulses per revolution.

Thus, there is no correlation between duty cycle and the number of teeth.

As can be seen, the combination of Behrens, Nath, and Stolfus does not suggest reducing the pulse rate so as to provide a consistent pulse rate regardless of the number of the fins of the non-ferromagnetic compressor wheel as required by independent claim 26. Therefore, independent claim 26 is not unpatentable over Behrens in view of Nath and further in view of Stolfus.

Because independent claim 26 is not unpatentable over Behrens in view of Nath and further in view of Stolfus, dependent claims 27-33 and 35 are

likewise not unpatentable over Behrens in view of Nath and further in view of Stolfus.

In section 17 of the Office Action, the Examiner rejected claim 34 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Adelerhof.

Adelerhof likewise does not suggest reducing the pulse rate so as to provide a consistent pulse rate regardless of the number of the fins of the non-ferromagnetic compressor wheel.

Accordingly, the combination of Behrens, Nath, Stolfus, and Adelerhof does not suggest the invention of independent claim 26. Therefore, independent claim 26 is not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Adelerhof.

Because independent claim 26 is not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Adelerhof, dependent claim 34 is likewise not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Adelerhof.

In section 18 of the Office Action, the Examiner rejected claim 36 under 35 U.S.C. §103(a) as being unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Hartman.

Hartman discloses a turbo-charged natural gas engine system 10 including a turbocharger compressor 12 which provides pressure boosted air to an intercooler 14, and then via an air throttle 16 to a natural gas engine 18. A natural gas supply 4 supplies fuel to an injector 6, which, in turn, supplies fuel to an air/fuel mixer 8. Engine exhaust flows from the engine 18 to a turbocharger turbine 20 and to a valve 22, and then to an exhaust 24.

An air pressure sensor 26 senses air pressure at an intake of the compressor 12, an air pressure sensor 28 senses air pressure at an outlet of the intercooler 14, and an intake manifold pressure sensor 30 senses pressure at the intake manifold of the engine 18. A humidity sensor 32 senses intake air humidity. A temperature sensor 34 senses intake air temperature, and a temperature sensor 36 senses manifold temperature upstream of the air throttle 16. An oxygen sensor 38 senses oxygen in the exhaust 24.

An electronic control unit 40 periodically executes algorithms so as to reduce turbocharger surge in an engine.

As can be seen, Hartman does not disclose or suggest reducing a pulse rate produced by a sensor in order to provide a consistent pulse rate regardless of the number of fins of a non-ferromagnetic compressor wheel.

Because Behrens, Nath, and Stolfus likewise do not disclose or suggest reducing a pulse rate produced by a sensor in order to provide a consistent pulse rate regardless of the number of fins of a non-ferromagnetic compressor wheel, it would not have been obvious to one of ordinary skill in the art to combine Behrens, Nath, Stolfus, and Hartman so as to produce the invention of independent claim 26.

Accordingly, independent claim 26 is not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Hartman.

Because independent claim 26 is not unpatentable over Behrens in view of Nath and further in view of Stolfus and still further in view of Hartman, dependent claim 36 is likewise not unpatentable over

Behrens in view of Nath and further in view of Stolfus and still further in view of Hartman.

CONCLUSION

In view of the above, it is clear that the claims of the present application are patentable over the references applied by the Examiner. Accordingly, allowance of these claims and issuance of the above captioned patent application are respectfully requested.

Respectfully submitted,

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